UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte STEPHAN J. JOURDAN, MICHAEL BEKERMAN,
RONNY RONEN, and LIHU RAPPOPORT

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Appeal 2007-2467
Application 09/750,150
Technology Center 2100

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Decided: October 29, 2007

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Before LANCE LEONARD BARRY, HOWARD B. BLANKENSHIP, and
STEPHEN C. SIU, *Administrative Patent Judges*.

SIU, *Administrative Patent Judge*.

DECISION ON APPEAL

I. STATEMENT OF THE CASE

     Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's

Final Rejection of claims 1-26. We have jurisdiction under 35 U.S.C.

§ 6(b). We affirm in part.

A. Invention

1The invention at issue involves a multi-mode predictor in a processor that predicts non-binary outcome values. Computer execution of an instruction may depend on a register value from another instruction. Also, when a computer processor reads values from memory to execute an instruction, the processor may be first required to calculate a corresponding memory address. As a result, a delay of execution of instructions may occur which may adversely affect performance. (Spec. 2).

Appellants invented a processor that selects a mode of prediction and predicts a value of an instruction based on the selected mode of prediction. (*Id*. 5-6). The processor and predictor breaks data dependency between multiple instructions to increase instruction level parallelism. (*Id*. 2)

B. Illustrative Claims

Claims 1 and 13, which further illustrate the invention, follow.

1.   A method for predicting values in a processor having a plurality of prediction modes, comprising:

receiving an instruction at a first table;

generating a valid signal from said first table;

providing a prediction mode for said instruction;

determining a hit in a second table, said second table to provide a prediction value, said hit in the second table being determined according to a function of said instruction and said first table; and

predicting the predicted value according to said hit and said prediction mode.

13.   A multi-mode predictor in a processor, comprising:

a first table indexed by an instruction pointer and having table entries that includes a mode field and an information field;

a second table indexed by a function of said instruction pointer and said first table; and a hit condition in said second table that correlates to a predicted value of a prediction mode.

C. REJECTION

Claims 1-26 stand rejected under 35 U.S.C. § 102(b) as anticipated by Kai Wang and Manoj Franklin, *Highly Accurate Data Value Prediction Using Hybrid Predictors*, IEEE, at 281-290 (1997) ("Wang").

II. CLAIM GROUPINGS

1"When multiple claims subject to the same ground of rejection are argued as a group by Appellant, the Board may select a single claim from the group of claims that are argued together to decide the appeal with respect to the group of claims as to the ground of rejection on the basis of the selected claim alone. Notwithstanding any other provision of this paragraph, the failure of appellant to separately argue claims which appellant has grouped together shall constitute a waiver of any argument that the Board

must consider the patentability of any grouped claim separately." 37 C.F.R. § 41.37(c)(1)(vii) (2005).[1]

Here, Appellants argue claims 1-26, which are subject to the same ground of rejection, as a group. (App. Br.[2] 10). Appellants argue claim 1 (and dependent claims 2-12) and apply the same arguments in support of the other independent claims 13, 19, and 24 (and dependent claims 14-18, 20-23, 25, and 26).[3] We note that not all of Appellants' arguments for claims 1-12 are applicable to claims 13-26. Therefore, we consider claim 1 as the sole claim on which to decide the appeal of claims 1-12 (the first group) and claim 13 as the sole claim on which to decide the appeal of claims 13-26 (the second group).

II. CLAIMS 1-12

"Rather than reiterate the positions of parties *in toto*, we focus on the issue therebetween." *Ex Parte Filatov*, No. 2006-1160, 2007 WL 1317144, at *2 (BPAI 2007). The Examiner indicated that claim 1 is deemed to be fully met by the disclosure of Wang. (Ans. 3-4). Appellants argue that

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[1] We cite to the version of the Code of Federal Regulations in effect at the time of the Appeal Brief. The current version includes the same rules.

[2] We rely on and refer to the revised Appeal Brief, in lieu of the original Appeal Brief, because the latter was defective. We will not consider the original in deciding this appeal.

[3] Appellant argues that "[i]ndependent claims 13, 19, and 24 contain substantively similar limitations and therefore should be allowed as well." (App. Br. 10). Therefore, Appellant relies on the same arguments with respect to deficiencies in Wang as applied against claim 1.

Wang does not disclose a "*second table to provide a prediction value*" (App. Br. 7) and that "the cited references do not disclose '… determining a hit in a second table …' as recited in claim 1." (*Id.* 9).

The Examiner equates the "second table" of claim 1 with the Pattern History Table (PHT) of Wang and further finds that "[t]he PHT outputs a selected PHT entry" and that "the selected PHT entry is the final prediction value or the 'predicted data value' in Figure 6 of Wang." (Ans. 14). Also, the Examiner asserts that Wang discloses a "hit" in the second table (i.e., the "PHT"). (Ans. 13).

The issue is whether Appellants have shown that the Examiner erred in rejecting claim 1 as being anticipated by Wang.

ANALYSIS

"[A]nticipation of a claim under § 102 can be found only if the prior art reference discloses every element of the claim. . . ." *In re King*, 801 F.2d 1324, 1326, 231 USPQ 136, 138 (Fed. Cir. 1986) (citing *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.,* 730 F.2d 1452, 1457, 221 USPQ 481, 485 (Fed. Cir. 1984)). "[A]bsence from the reference of any claimed element negates anticipation." *Kloster Speedsteel AB v. Crucible, Inc.,* 793 F.2d 1565, 1571, 230 USPQ 81, 84 (Fed. Cir. 1986).

Wang discloses a hybrid predictor containing a Value History Table (VHT) and a Pattern History Table (PHT). (Wang at 285). The VHT contains a corresponding Data Values field of the "4 most recent unique values" corresponding to results for the instruction (*Id.* at 285, col. 2) and a

Value History Pattern field that "stores as a $2p$-bit pattern the last p outcomes of an instruction." (*Id*.).

As mentioned above, the Examiner equates the "second table" of claim 1 with Wang's "PHT." The PHT contains counter values that provide "a condensed history of the previous outcomes [of instructions]." (*Id*.). Also, Wang illustrates that the PHT receives data input from the Value History Pattern Field of the VHT and a "Predicted Data Value" is output from a 2:1 MUX, the input of which is received from the Data Values fields of the VHT via a 4:MUX and "+" component. (*Id*. at 288, Figure 6).

We agree with the Examiner that Wang discloses a "hit" in the PHT. During operation of the Wang system, the VHT receives an instruction corresponding to a value in the Data Values field and Value History Pattern field of the VHT. The Value History Pattern field value is used to select a corresponding counter value in the PHT. (*Id*. at 285, col. 2). Appellants assert that a "hit" in the second table is "a determination of whether a match occurs in a table (or the like)." (Reply Br. 6). In the Wang system, a match is identified between a value from the Value History Pattern field of the VHT and a corresponding value in the PHT.

However, we are unpersuaded that the PHT provides a "prediction value" as recited in claim 1. Rather, the PHT of Wang provides a counter value to the VHT while the prediction value is provided by the VHT (i.e., the "first table" that receives "an instruction"). The absence of the second table (i.e., PHT) providing the prediction value negates anticipation.

Therefore, we reverse the rejection of claim 1.

III. CLAIMS 13-26

As set forth above, Appellants argue claims 13-26, which are subject to the same ground of rejection, as a group and asserts claims 13-26 contain "substantively similar limitations" as claim 1. (App. Br. 10). We select claim 13 as the sole claim on which to decide the appeal of this group.

The Examiner finds that Wang discloses all elements of claim 13. (Ans. 13). Appellants assert, on the other hand, that Wang fails to disclose a hit in the second table. (App. Br. 9). As set forth above, we agree with the Examiner that Wang discloses a "hit condition in said second table" as recited in claim 13.

Appellants further argue that Wang fails to disclose a second table to provide a prediction value. (*Id*.). Claim 13 recites a hit condition in the second table that correlates to a predicted value of a prediction mode. As aforementioned, Wang discloses a "hit" condition in which a match is determined between a Value History Pattern in the VHT with a corresponding value in the PHT. A corresponding counter value from the PHT is used to provide a prediction value from the Data Values field of the VHT. (Wang at 285, col. 2 and 288, col. 2). Contrary to Appellants' assertion, claim 13 merely requires that the hit correlate to a predicted value. Claim 13 fails to recite that the second table provides the prediction value. We agree with the Examiner that Wang discloses that a hit condition occurs in the PHT that "correlates to a predicted value."

It follows that Appellants have failed to demonstrate that the Examiner erred in rejecting claim 13 as being anticipated by Wang. Therefore, we affirm the rejection of claim 13, and of claims 14-26, which fall therewith.

IV. ADDITIONAL OBSERVATIONS

We note a possible issue with claim 1 under 35 U.S.C. 112, second paragraph. Claim 1 recites "predicting the predicted value" which lacks antecedent basis. It appears that "the predicted value" refers to the earlier recitation of "a prediction value."

We also note a typographical error in the figures. Specifically, the "Next Value Table" (NVT 124) in FIG. 1 is mislabeled as "NUT 124."

Being "basically a board of review," *Ex parte Gambogi*, 62 USPQ2d 1209, 1211 (B.P.A.I. 2001), however, we leave the question of indefiniteness of claim 1 and typographical errors in the specification to the Examiner and Appellants.

V. ORDER

In summary, the rejection of claims 13-26 under § 102(b) is affirmed. The rejection of claims 1-12 under § 102(b) is reversed.

No time for taking any action connected with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

<u>AFFIRMED IN PART</u>

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